Employment
Electroneurodiagnostic technologists held about 5,400 jobs in 1998. Most worked in neurology laboratories of hospitals, whereas others worked in offices and clinics of neurologists and neurosurgeons, sleep centers, or psychiatric facilities.

Training, Other Qualifications, and Advancement
Although most electroneurodiagnostic technologists currently employed learned their skills on the job, employers are beginning to favor those who have completed formal training. Some hospitals require applicants for trainee positions to have postsecondary training, whereas others only expect a high school diploma. Recommended high school and college subjects for prospective technologists include health, biology, anatomy, and mathematics. Often, on-the-job trainees are transfers from other hospital jobs, such as licensed practical nurses.

Formal postsecondary training is offered in hospitals and community colleges. In 1998, the Joint Review Committee on Education in Electroneurodiagnostic Technology approved 12 formal programs. Programs usually last from 1 to 2 years and include laboratory experience, as well as classroom instruction in human anatomy and physiology, neurology, neuroanatomy, neurophysiology, medical terminology, computer technology, electronics, and instrumentation. Graduates receive associate degrees or certificates.

The American Board of Registration of Electroencephalographic and Evoked Potential Technologists awards the credentials Registered EEG Technologist, Registered Evoked Potential Technologist, and Certificate in Neurophysiologic Intraoperative Monitoring to qualified applicants. The Association of Polysomnographic Technologists registers polysomnographic technologists. Applicants interested in taking the registration exam must have worked in a sleep center for at least 1 year. Although not generally required for staff level jobs, registration indicates professional competence, and is usually necessary for supervisory or teaching jobs. In addition, the American Association of Electrodiagnostic Technologists provides certification in the field of nerve conduction studies for electroneurodiagnostic technologists.

These technologists should have manual dexterity, good vision, good writing skills, an aptitude for working with electronic equipment, and the ability to work with patients as well as with other health personnel.

Experienced electroneurodiagnostic technologists can advance to chief or manager of an electroneurodiagnostic laboratory. Chief technologists are generally supervised by a physician—an electroencephalographer, neurologist, or neurosurgeon. Technologists may also teach or go into research.

Job Outlook
Employment of electroneurodiagnostic technologists is expected to grow more slowly than the average for all occupations through the year 2008. Although employment will increase as new procedures and technologies are developed and as the size of the population grows, productivity gains caused by increasingly sophisticated equipment and cross-trained employees will limit employment growth. Only a small number of openings are expected each year, due primarily to the need to replace technologists who transfer to other occupations or retire. Most jobs will be found in hospitals, but growth will be fastest in offices and clinics of neurologists.

Earnings
Median annual earnings of electroneurodiagnostic technologists were $32,070 in 1998. The middle 50 percent earned between $26,610 and $38,500 a year. The lowest 10 percent earned less than $22,200 and the highest 10 percent earned more than $46,620 a year.

Related Occupations
Other health personnel who operate medical equipment to diagnose and treat patients include radiologic technologists, nuclear medicine technologists, sonographers, perfusionists, and cardiovascular technologists.

Sources of Additional Information
For general information about a career in electroneurodiagnostics and a list of accredited training programs, contact:

☛ Executive Office, American Society of Electroneurodiagnostic Technologists, Inc., 204 W. 7th St., Carroll, IA 51401.
Internet: **http://www.aset.org**

For information on opportunities in sleep studies, contact:

☛ Association of Polysomnographic Technology, 2025 South Washington, Suite 300, Lansing, MI 48910-0817.

Information about specific accredited training programs is also available from:

☛ Joint Review Committee on Electroneurodiagnostic Technology, Route 1, Box 63A, Genoa, WI 54632.

Information on becoming a registered electroneurodiagnostic technologist is available from:

☛ American Board of Registration of Electroencephalgraphic and Evoked Potential Technologists, P.O. Box 916633, Longwood, FL 32791-6633.

Information on certification in the field of nerve conduction studies is available from:

☛ American Association of Electrodiagnostic Technologists, 35 Hallett Lane, Chatham, MA 02633-2408.

Emergency Medical Technicians and Paramedics

(O*NET 32508)

Significant Points

- Irregular hours and treating patients in life-or-death situations lead to job stress in this occupation.
- State requirements vary, but formal training and certification are required.
- Employment is projected to grow rapidly as paid emergency medical technician positions replace unpaid volunteers.

Nature of the Work
People's lives often depend on the quick reaction and competent care of emergency medical technicians (EMTs) and paramedics. Incidents as varied as automobile accidents, heart attacks, drownings, childbirth, and gunshot wounds all require immediate medical attention. EMTs and paramedics provide this vital attention as they care for and transport the sick or injured to a medical facility.

Depending on the nature of the emergency, EMTs and paramedics typically are dispatched to the scene by a 911 operator and often work with police and fire department personnel. Once they arrive, they determine the nature and extent of the patient's condition while trying to ascertain whether the patient has preexisting medical problems. Following strict procedures, they give appropriate emergency care and transport the patient. Some conditions can be handled following general rules and guidelines, while more complicated problems are carried out under the direction of medical doctors by radio.

EMTs and paramedics may use special equipment such as backboards to immobilize patients before placing them on stretchers and securing them in the ambulance for transport to a medical facility. Usually, one EMT or paramedic drives while the other monitors the patient's vital signs and gives additional care as

needed. Some who work for hospital trauma centers, which use helicopters to transport critically ill or injured patients, are part of the flight crew.

At the medical facility, EMTs and paramedics help transfer patients to the emergency department, report their observations and actions to staff, and may provide additional emergency treatment. Some paramedics are trained to treat patients with minor injuries on the scene of an accident or at their home without transporting them to a medical facility. After each run, EMTs replace used supplies and check equipment. If a transported patient had a contagious disease, EMTs decontaminate the interior of the ambulance and report cases to the proper authorities.

Beyond these general duties, the specific responsibilities of EMTs and paramedics depend on their level of qualification and training. To determine this, the National Registry of Emergency Medical Technicians (NREMT) registers emergency medical service (EMS) providers at four levels: First Responder, EMT-Basic, EMT-Intermediate, and EMT-Paramedic. Some States, however, do their own certification and use numeric ratings from 1 to 4 to distinguish levels of proficiency.

The lowest level—First Responders—are trained to provide basic emergency medical care because they tend to be the first persons to arrive at the scene of an incident. Many firefighters, police officers, and other emergency workers have this level of training. The EMT-Basic, also known as EMT-1, represents the first component of the emergency medical technician system. An EMT-1 is trained to care for patients on accident scenes and on transport by ambulance to the hospital under medical direction. The EMT-1 has the emergency skills to assess a patient's condition and manage respiratory, cardiac, and trauma emergencies.

The EMT-Intermediate (EMT-2 and EMT-3) has more advanced training that allows administration of intravenous fluids, use of manual defibrillators to give lifesaving shocks to a stopped heart, and use of advanced airway techniques and equipment to assist patients experiencing respiratory emergencies. EMT-Paramedics (EMT-4) provide the most extensive pre-hospital care. In addition to the procedures already described, paramedics may administer drugs orally and intravenously, interpret electrocardiograms (EKGs), perform endotracheal intubations, and use monitors and other complex equipment.

Working Conditions

EMTs and paramedics work both indoors and outdoors, in all types of weather. They are required to do considerable kneeling, bending, and heavy lifting. These workers risk noise-induced hearing loss from sirens and back injuries from lifting patients. In addition, EMTs and paramedics may be exposed to diseases such as Hepatitis-B and AIDS, as well as violence from drug overdose victims or psychologically disturbed patients. The work is not only physically strenuous, but also stressful, involving life-or-death situations and suffering patients. Nonetheless, many people find the work exciting and challenging and enjoy the opportunity to help others.

EMTs are often the first to appear at the scene of injuries.

EMTs and paramedics employed by fire departments work about 50 hours a week. Those employed by hospitals frequently work between 45 and 60 hours a week, and those in private ambulance services, between 45 and 50 hours. Some of these workers, especially those in police and fire departments, are on call for extended periods. Because emergency services function 24 hours a day, EMTs and paramedics have irregular working hours that add to job stress.

Employment

EMTs and paramedics held about 150,000 jobs in 1998. In addition, there are many more volunteer EMTs, especially in smaller cities, towns, and rural areas, who work for departments where they may respond to only a few calls for service per month. Most career EMTs and paramedics work in metropolitan areas.

EMTs and paramedics are employed in a number of industries. Nearly half work in local and suburban transportation for private ambulance firms that transport and treat individuals on an emergency or non-emergency basis. About a third of EMTs and paramedics work in local government for fire departments and third service providers, in which emergency medical services are provided by an independent agency. Another fifth are found in hospitals, where they may work full-time within the medical facility or respond to calls in ambulances or helicopters to transport critically ill or injured patients.

Training, Other Qualifications, and Advancement

Formal training and certification is needed to become an EMT or paramedic. All 50 States possess a certification procedure. In 38 States and the District of Columbia, registration with the National Registry is required at some or all levels of certification. Other States administer their own certification examination or provide the option of taking the National Registry examination. To maintain certification, EMTs and paramedics must re-register, usually every 2 years. In order to re-register, an individual must be working as an EMT and meet a continuing education requirement.

Training is offered at progressive levels: EMT-Basic, also known as EMT-1; EMT-Intermediate, or EMT-2 and EMT-3; and EMT-paramedic, or EMT-4. The EMT-Basic represents the first level of skills required to work in the emergency medical system. Coursework typically emphasizes emergency skills such as managing respiratory, trauma, and cardiac emergencies and patient assessment. Formal courses are often combined with time in an emergency room or ambulance. The program also provides instruction and practice in dealing with bleeding, fractures, airway obstruction, cardiac arrest, and emergency childbirth. Students learn to use and maintain care for common emergency equipment, such as backboards, suction devices, splints, oxygen delivery systems, and stretchers. Graduates of approved EMT basic training programs who pass a written and practical examination administered by the State certifying agency or the National Registry of Emergency Medical Technicians earn the title of Registered EMT-Basic. The course is also a prerequisite for EMT-Intermediate and EMT-Paramedic training.

EMT-Intermediate training requirements vary from State to State. Applicants can opt to receive training in EMT-Shock Trauma, where the caregiver learns to start intravenous fluids and give certain medications, or in EMT-Cardiac, which includes learning heart rhythms and administering advanced medications. Training commonly includes 35-55 hours of additional instruction beyond EMT-Basic coursework and covers patient assessment as well as the use of advanced airway devices and intravenous fluids. Prerequisites for taking the EMT-Intermediate examination include registration as an

EMT-Basic, required classroom work, and a specified amount of clinical experience.

The most advanced level of training for this occupation is EMT-Paramedic. At this level, the caregiver receives additional training in body function and more advanced skills. The Paramedic Technology program usually lasts up to 2 years and results in an associate degree in applied science. Such education prepares the graduate to take the National Registry of Emergency Medical Technicians examination and become certified as an EMT-Paramedic. Extensive related coursework and clinical and field experience is required. Due to the longer training requirement, almost all EMT-Paramedics are in paid positions. Refresher courses and continuing education are available for EMTs and paramedics at all levels.

EMTs and paramedics should be emotionally stable, have good dexterity, agility, and physical coordination, and be able to lift and carry heavy loads. They also need good eyesight (corrective lenses may be used) with accurate color vision.

Advancement beyond the EMT-Paramedic level usually means leaving fieldwork. An EMT-Paramedic can become a supervisor, operations manager, administrative director, or executive director of emergency services. Some EMTs and paramedics become instructors, dispatchers, or physician assistants, while others move into sales or marketing of emergency medical equipment. A number of people become EMTs and paramedics to assess their interest in health care and then decide to return to school and become registered nurses, physicians, or other health workers.

Job Outlook

Employment of EMTs is expected to grow faster than the average for all occupations through 2008. Much of this growth will occur as positions change from volunteer to paid and as the population grows, particularly older age groups that are the greatest users of emergency medical services. In addition to job growth, openings will occur because of replacement needs; some workers leave because of stressful working conditions, limited advancement potential, and the modest pay and benefits in the private sector.

Most opportunities for EMTs and paremedics are expected to arise in hospitals and private ambulance services. Competition will be greater for jobs in local government, including fire, police, and third service rescue squad departments, where job growth for these workers is expected to be slower.

Earnings

Earnings of EMTs depend on the employment setting and geographic location as well as the individual's training and experience. Median annual earnings of EMTs were $20,290 in 1998. The middle 50 percent earned between $15,660 and $26,240. The lowest 10 percent earned less than $12,700 and the highest 10 percent earned more than $34,480. In local and suburban transportation, where private ambulance firms are located, the median salary was $18,300 in 1997. In local government, except education and hospitals, the median salary was $21,900. In hospitals, the median salary was $19,900.

Those in emergency medical services who are part of fire or police departments receive the same benefits as firefighters or police officers. For example, many are covered by pension plans that provide retirement at half pay after 20 or 25 years of service or if disabled in the line of duty.

Related Occupations

Other workers in occupations that require quick and level-headed reactions to life-or-death situations are police officers, firefighters, air traffic controllers, and workers in other health occupations.

Sources of Additional Information

General information about EMTs and paramedics is available from:

☛ National Association of Emergency Medical Technicians, 408 Monroe St., Clinton, MS 39056. Internet: **http://www.naemt.org**

☛ National Registry of Emergency Medical Technicians, P.O. Box 29233, Columbus, OH 43229. Internet: **http://www.nremt.org**

☛ National Highway Transportation Safety Administration, EMS Divion, 400 7th St. SW., NTS-14, Washington DC.
Internet: **http://www.nhtsa.dot.gov/people/injury/ems/**

Health Information Technicians

(O*NET 32911)

Significant Points

- Health information technicians are projected to be one of the 20 fastest growing occupations.
- High school students can improve chances of acceptance into a health information education program by taking courses in biology, chemistry, health, and especially computer training.
- Most technicians will be employed by hospitals, but job growth will be faster in offices and clinics of physicians, nursing homes, and home health agencies.

Nature of the Work

Every time health care personnel treat a patient, they record what they observed, and how the patient was treated medically. This record includes information the patient provides concerning their symptoms and medical history, the results of examinations, reports of x-rays and laboratory tests, diagnoses, and treatment plans. Health information technicians organize and evaluate these records for completeness and accuracy.

Health information technicians, who may also be called medical record technicians, begin to assemble patients' health information by first making sure their initial medical charts are complete. They ensure all forms are completed and properly identified and signed, and all necessary information is in the computer. Sometimes, they talk to physicians or others to clarify diagnoses or get additional information.

Technicians assign a code to each diagnosis and procedure. They consult classification manuals and rely, also, on their knowledge of disease processes. Technicians then use a software program to assign the patient to one of several hundred "diagnosis-related groups," or DRG's. The DRG determines the amount the hospital will be reimbursed if the patient is covered by Medicare or other insurance programs using the DRG system. Technicians who specialize in coding are called health information coders, medical record coders, coder/abstractors, or coding specialists. In addition to the DRG system, coders use other coding systems, such as those geared towards ambulatory settings.

Technicians also use computer programs to tabulate and analyze data to help improve patient care or control costs, for use in legal actions, or in response to surveys. *Tumor registrars* compile and maintain records of patients who have cancer to provide information to physicians and for research studies.

Health information technicians' duties vary with the size of the facility. In large to medium facilities, technicians may specialize in one aspect of health information, or supervise health information clerks and transcribers while a *health information administrator* manages the department (see the statement on health services managers elsewhere in the *Handbook*). In small facilities, an accredited health information technician sometimes manages the department.

Working Conditions

Health information technicians usually work a 40-hour week. Some overtime may be required. In hospitals where health information departments are open 18-24 hours a day, 7 days a week, they may work day, evening, and night shifts.